currence descriptions. It supports a variety of input parameters, including a start to the sequence, an end to the sequence, an Ical/RFC 2445 recurrence describing the frequency of the values in the series, and a format description that can refine the presentation manner of the *DateTime*.

Iterator::String constructs iterators from string representations. This module is useful in contexts where the API consists of supplying a string and getting back an iterator where the specific iteration desired is opaque to the caller. It is of particular value to the *Iterator::Hash* module which provides nested iterations.

Iterator::Hash constructs iterators from Perl hashes that can include multiple iterators. The constructed iterators will return all the permutations of the iterations of the hash by nested iteration of embedded iterators. A hash simply includes a set of keys mapped to values. It is a very common data structure used throughout Perl programming. The *Iterator::Hash* module allows a hash to include strings defining iterators (parsed and dispatched with *Iterator::String*) that are used to construct an overall series of hash values.

Tropical Cyclone Information System

NASA's Jet Propulsion Laboratory, Pasadena, California

The JPL Tropical Cyclone Information System (TCIS) is a Web portal (http://tropicalcyclone.jpl.nasa.gov) that provides researchers with an extensive set of observed hurricane parameters together with large-scale and convection-resolving model outputs. It provides a comprehensive set of high-resolution satellite (see figure), airborne, and *in-situ* observations in both image and data formats. Large-scale datasets depict the surrounding environmental parameters such as SST (Sea Surface Temperature) and aerosol loading. Model outputs and analysis tools are provided to evaluate model performance and compare observations from different platforms.

The system pertains to the thermodynamic and microphysical structure of the storm, the air-sea interaction processes, and the larger-scale environment as depicted by ocean heat content and the aerosol loading of the environment.

Currently, the TCIS is populated with satellite observations of all tropical cy-
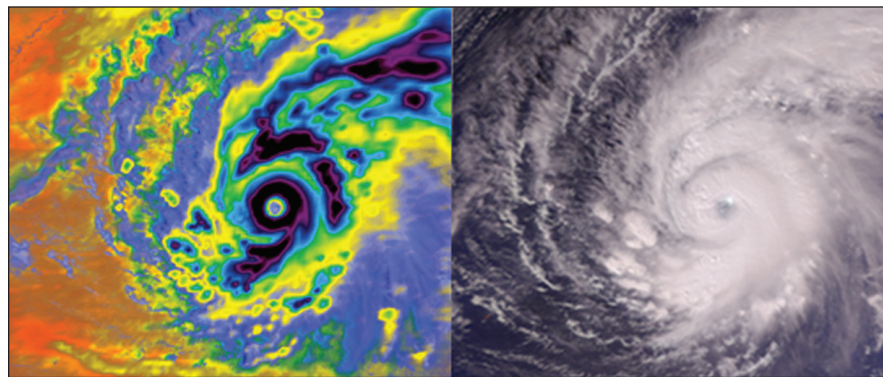
Images of Supertyphoon Pongsona that struck the U.S. island of Guam on December 8, 2002. The composite image on left was made by overlaying data from the infrared, microwave, and visible/near infrared sensors. A standard image is on the right.

clones observed globally during 2005. There is a plan to extend the database both forward in time till present as well as backward to 1998. The portal is powered by a MySQL database and an Apache/Tomcat Web server on a Linux system. The interactive graphic user interface is provided by Google Map.

XML Translator for Interface Descriptions

NASA's Jet Propulsion Laboratory, Pasadena, California

A computer program defines an XML schema for specifying the interface to a generic FPGA from the perspective of software that will interact with the device. This XML interface description is then translated into header files for C, Verilog, and VHDL. User interface definition input is checked via both the provided XML schema and the translator module to ensure consistency and accuracy.

Currently, programming used on both sides of an interface is inconsistent. This makes it hard to find and fix errors. By using a common schema, both sides are forced to use the same structure by using the same framework and toolset. This makes for easy identification of problems, which leads to the ability to formulate a solution.

The toolset contains constants that allow a programmer to use each register, and to access each field in the register. Once programming is complete, the translator is run as part of the make process, which ensures that whenever an interface is changed, all of the code that uses the header files describing it is recompiled.